

## **Geographical Analysis of the Efficiency of Health Centers in Al-Mansour District 2020**

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### **Abstract**

Health centers are among the important health institutions in the city, so the research dealt with health centers in the Mansour sub-district as a sector of health services in the city, for the purpose of studying their reality in terms of their numbers, the number of their staff and the extent of their spatial distribution according to residential neighborhoods, as well as comparing the size with the variables of the health centers. The study relied on the data available on the Baghdad Health Department Al-Karkh, as well as relying on the field study through the questionnaire form of the health centers as well as the personal interview, and the office sources. (15) health centers and (3) specialized centers, while the second investigator discussed the functional and spatial competence of health centers in Al-Mansour district.

**Keywords:** Geographical analysis, health centers, Al-Mansour district, 2020.

### **Introduction**

Health services are among the necessary and basic services in the city for its direct relationship with the population, as this service has its social effects on the city's residents, and the availability of such a service reflects the level of the city and its community, and this study came to shed light on this vital sector and solve the efficiency of health services and its problems , in light of the standards adopted in Iraq and the World Health Organization, so it is necessary to distribute health centers in proportion to the number of the population, because the continuous increase in the size of the population creates pressure on the overall health services within the city and reduces their efficiency

Therefore, the research dealt with health centers in Al-Mansour district, among other health institutions, to determine the efficiency of their spatial distribution and their functional efficiency.

### **Research problem**

1- What is the reality of the geographical distribution of health centers in Al-Mansour district for the year 2020?

2- Do health centers achieve geographical efficiency (functional and spatial) according to the local standards adopted by the Ministry of Health and Planning?

### **Research Hypothesis**

1- The preparation of health centers is very few and is not in line with the population numbers, and it is not evenly distributed according to the residential neighborhoods and their density.

2- The health centers in Al-Mansour district suffer from a shortage in their services and the number of their cadres, which is reflected on their functional and spatial efficiency.

search objective

1- The study aims to know the reality of the geographical distribution of health centers in Al-Mansour district.

2- Evaluating the efficiency of health centers functionally and spatially.

3- Develop immediate and future solutions and treatments that should be carried out by the competent authorities in order to raise and develop the health level and raise it to a level that achieves the purpose of its existence and service to the city's residents.

### **The importance of studying**

1- The need for a detailed study of the geographical distribution of health centers in Al-Mansour district and ways to develop them as they are of the most important services in relation to the rest of the other services.

2- To identify the extent of compatibility between the growth of the number of health centers and the growth of the growing population.

### **Study Methodology**

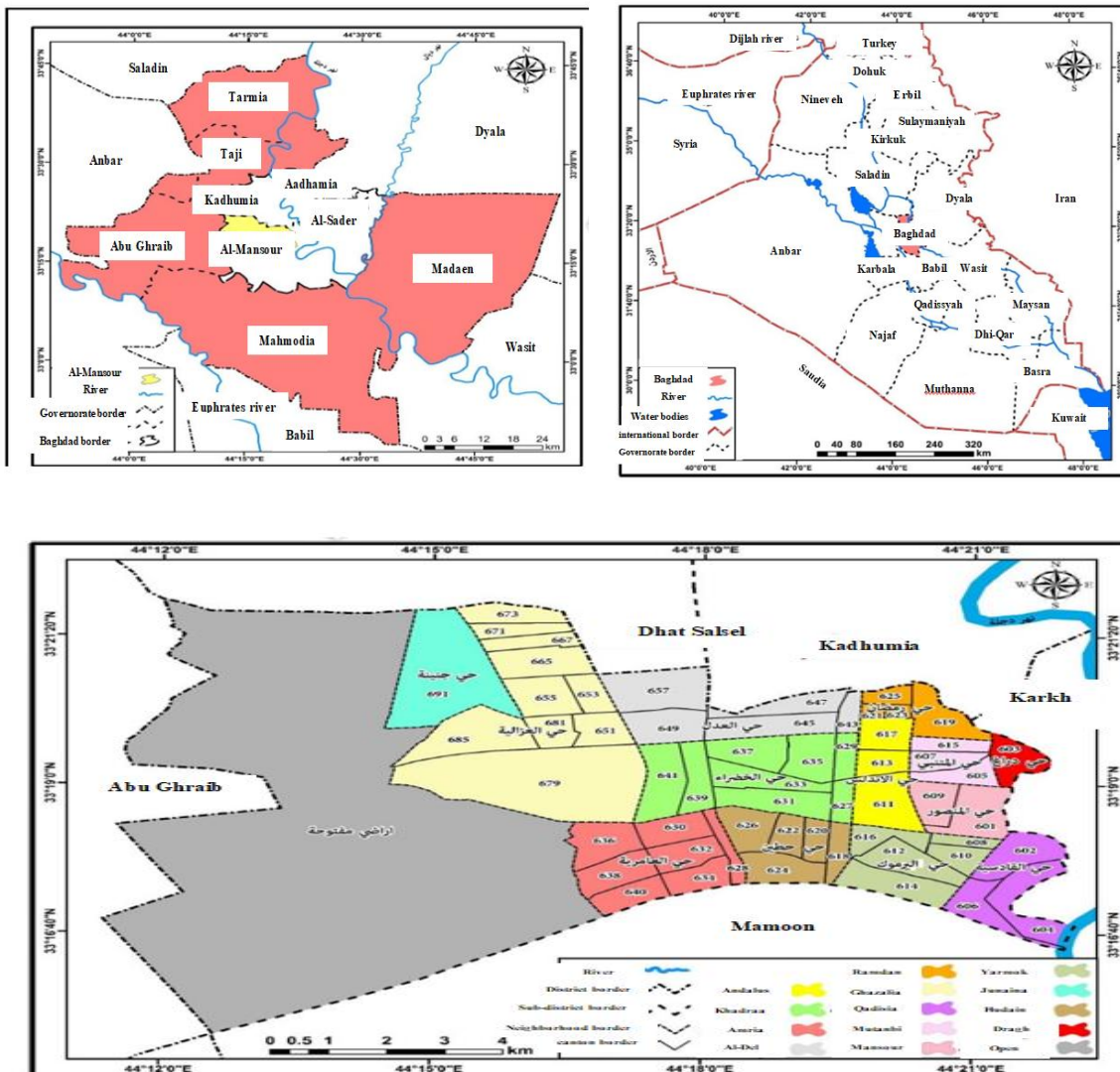
The research relied on the historical and descriptive method and the geographical, analytical and statistical method to reveal the image of the spatial distribution of health services in Al-Mansour district and measure their efficiency.

### **Study area boundaries**

The spatial boundaries of the study include the area occupied by the Al-Mansur municipality, which is located in the city of Baghdad, the capital of Iraq, between two latitudes ( $33^{\circ}16'$ ) ( $33^{\circ}21'$ ) north, and longitudes ( $44^{\circ}12'$ ) ( $44^{\circ}21'$ ) to the east, bordered by the Al-Silsil district and the center of Al-Kadhimiya district from the north, the Karkh municipality and part of the Tigris River from the east, and Al-Mamoon district from the south and from the west its borders with Abu Ghraib district, occupying an area of (6437.9) hectares, of the area of Baghdad

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amounting to (89054. ) hectares, and Al-Mansour district consists of (13) residential neighborhoods that include (Al-Ghazaliya - Al-Khadra - Al-Amriya - Al-Adl - Al-Jeneina - Al-Yarmouk - Hittin - Al-Qadisiyah - Al-Andalus - Al-Mansour - Ramadan - Al-Mutanabi - Drag). Al-Mansour district is Al-Ghazaliya neighborhood, which amounts to (1631.9) hectares, while the smallest neighborhood in terms of area is the Daragh neighborhood, which occupies an area of (94.7) hectares, and you find reference to the presence of open lands that occupy an area of (5995.1) hectares, which includes agricultural areas and the lands of Baghdad International Airport



Map (1) of the location of Al-Mansour district of Iraq and Baghdad governorate.

Source/ Ministry of Water Resources, Public Survey Authority, Design Division, 100000:1 scale, year 2020, using Arc GIS program 9,3.

**The first topic: the geographical distribution of health centers in Al-Mansour district**

They are institutions that are available to members of society in ways and methods that they accept and can afford to pay for (Dhiab, 2010), and emphasize the importance of health promotion and the adoption of healthy behaviors that are not contrary to health, as they depend on disease prevention as much as possible in addition to curative and rehabilitative care (Fayadh, 2011).

**A- The main health centers**

These centers are spread on a large scale in the district and sub-district centers, to provide health services to all residents without difficulty or discrimination and are equipped with small units such as (laboratory unit, pharmacy unit, health control unit, school health unit, maternity unit) and these health centers are managed by doctors two years (Ghadban, 2017).

By noting Table (1) and Map (2), it is clear that the total of the main health centers in Al-Mansour district are (15) health centers, and these centers were distributed by (4) health centers in the Ghazaliya neighborhood, one center in Al-Adel neighborhood, two centers in Al-Khadhraa neighborhood and one center In the Andalus neighborhood, two centers in the Ramadan neighborhood, two centers in the Yarmouk neighborhood, one center in the Hittin neighborhood, and one center in the Al-Amiriya neighborhood, as all these health centers provided services to the residents of the district.

**Table (1) The spatial distribution of the main health centers in Al-Mansour district for the year 2020.**

No.	Health centers	Neighborhood	Canton	Area (m <sup>2</sup> )	Percent (%)	Building No.	Building Year
1	Wshash	Ramadan	619	2000	4.5	1	1953
2	Eskan	Ramadan	625	700	1.5	1	1976
3	Dakhliya	Yarmouk	614	2100	4.7	1	1978
4	Bakria	Ghazalia	685	1500	3.4	1	1981
5	Al-Adel	Al-Adel	645	4600	10.4	1	1984
6	Ghazalia	Ghazalia	665	3800	8.6	1	1986
7	Al-Saad	Ghazalia	655	800	1.8	1	1989
8	Al-Amiria	Al-Amiria	630	12800	29	1	1990
9	Al-Jamea	Al-Khadhraa	637	1400	3.1	1	2004
10	Al-Mansour	Andalus	617	1600	3.6	1	2009
11	Al-Khadhraa	Al-Khadhraa	641	2100	4.7	1	2011
12	New Iraq	Ghazalia	673	2000	4.5	1	2011
13	Hedain	Hedain	622	2700	6.1	1	2013
14	Al-Amiria	Al-Amiria	630	12800	29	1	2013

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15	Baghdad Airport	Open land	-	2500	5.6	1	2014
	Total			44100	100		

Source/ based on:

- field study

- Republic of Iraq, Ministry of Health, Baghdad/Karkh Health Department, Technical Affairs Department, Survey Division, unpublished data, 2020.

- Republic of Iraq, Ministry of Health, Baghdad/Karkh Health Department, Planning Department, Health Centers and Family Medicine Division, unpublished data, 2020.

**Table (2) Distribution of working cadres and number of auditors in the main health centers in Al-Mansur district for the year 2020.**

No .	Health centers	Type	Sp . Dr .	Gen . Dr.	Din . Dr.	Pharm .	Nurs e	Healt h prof.	Medica l tech.	Serv. Tech .	Rev. No.
1	Ghazalia	Main	3	4	6	2	2	28	1	12	56847
2	Bakria	Main	1	3	6	2	0	20	1	9	25462
3	Al-Saad	Main	2	6	6	3	0	25	2	11	21982
4	New Iraq	Main	3	4	4	2	0	10	0	5	19254
5	Al-Amiria	Main	4	6	15	3	2	33	2	11	29724
6	Al-Adel	Main	2	5	8	4	2	32	1	9	33717
7	Al-Khadhra a	Main	3	6	10	2	0	30	8	12	28465
8	Al-Mansour	Main	7	11	10	4	2	33	4	14	26825
9	Washash	Main	3	7	13	3	4	17	2	6	15365
10	Yarmouk	Main	3	6	12	6	2	27	3	13	27936
11	Hidain	Main	1	3	12	3	0	25	0	9	22165

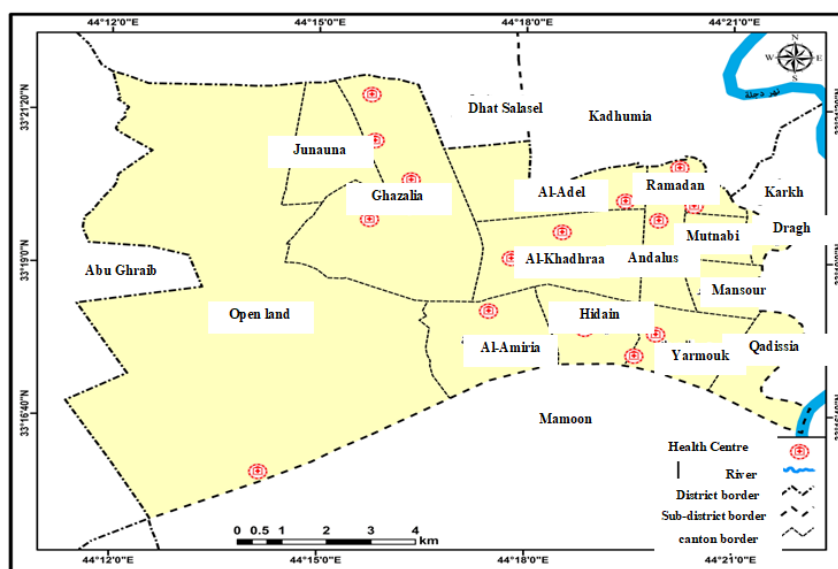
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12	<b>Al-Jamea</b>	Main	1	2	2	2	0	3	0	5	19743
13	<b>Eskan</b>	Main	2	5	8	1	2	20	2	6	23827
14	<b>Al-Dakhliya</b>	Main	1	6	8	3	2	26	3	8	16284
15	<b>Baghdad Airport</b>	Main	2	7	2	3	13	10	0	14	33925
<b>Total</b>			38	81	122	43	31	339	29	144	408793

Source / Republic of Iraq, Ministry of Health, Baghdad Health Department / Karkh, Planning Department, Manpower Division, unpublished data, 2020.

- Republic of Iraq, Ministry of Health, Baghdad Health Department / Karkh, Division of Health Centers and Family Medicine, unpublished data, 2020.

- Republic of Iraq, Ministry of Health, Baghdad/Karkh Health Department, Karkh and Justice Sector for Primary Health Care, unpublished data, 2020.



Map (2) of the spatial distribution of the main health centers in Al-Mansour district for the year 2020. Source/ based on data from Table (1).

Tables (1) and (2) show the distribution of health centers in Al-Mansour district for the year 2020 as follows:

### 1- Ghazaliya Health Center

Al-Ghazaliya Health Center is located in Al-Ghazaliya neighborhood, locality (665). It was established in 1986. The center's area is (3800 m<sup>2</sup>). It consists of one building consisting of a number of units that provide service to the residents of the study area, including (laboratory unit, and integrated care unit for women and children's health). The number of visitors in Al-Ghazaliya Health Center reached 56,847, the number of specialized doctors was (3), the number of general doctors was (4), and the number of dentists in the center was (6), and the number of pharmacists was (2). The number of nursing cadres is (2) nurses, and the number of health professionals is (28) employees, while the number of technicians is (1) medical technician, and the number of administrators, technicians and service workers working in the center is (12) employees.

## **2- Martyr SaifZaki Al-Saad Health Center**

The center is located in Al-Ghazaliya neighborhood, locality (655). The center is classified as one of the main centers in the study area. It was established in 1989. It has an area of (800 m<sup>2</sup>). The center consists of one building consisting of a number of units that serve the study area, including (dental unit, nutritional unit, and unit The laboratory, the pressure and diabetes unit, the vaccination unit, the mother's care unit, and the integrated care unit for the health of the child under the age of five. The number of visitors to the center was (21982) out of the total number of visitors to the main health centers in Al-Mansur district, while the number of specialized doctors was (2) and the number General physicians are (6) physicians, the number of dentists is (6), while the number of pharmacists is (3), and the number of health professionals is (25) employees, while the number of technicians is (2) medical technician, and the number of administrators, technicians and servicemen working in The center has (11) employees.

## **3- Al-Bakriya Health Center**

This center is located in Al-Ghazaliya neighborhood, locality (685), was established in 1981. The area of the center is (1500 m<sup>2</sup>). It consists of one building containing a number of health units. The number of visitors to the center reached (25462), and the number of specialized doctors in this center was (3) The number of general practitioners reached (4), the number of dentists was (6), while the number of pharmacists was (2) pharmacists, while the number of health professionals reached (20) employees, and the number of technicians was (1) medical technician, while the number of technicians was (1) medical technician. Administrators, technicians and servicemen (9) employees.

## **4- New Iraq Health Center**

It is located in the Ghazaliya neighborhood in the locality of (673), it was established in 2011, and it occupies an area of (2000 m<sup>2</sup>). The number of visitors to these centers reached (19254). The number of specialized doctors was (3), and the number of general practitioners was (4), while the number of dentists was (4), and the number of pharmacists was (2) pharmacists, and

the number of health professionals working in the center reached (10) employees, while the number of Administrators, technicians and servicemen (5) employees.

### **5- Al-Amriya Health Center**

The center is located in Al-Amiriya district (630), was established in 1990, has an area of (12800 m<sup>2</sup>) and is one of the largest major health centers in the study area in terms of area. The center contains a number of units that provide services to the study area, including the community eye care unit, which is available It contains medical devices and supplies for eye examination, blood pressure and diabetes unit, and a social psychological health unit. The center also has a pharmacy that provides medicines to patients. 6 Doctors The number of dentists working in the center reached (15), while the number of pharmacists was (3), the number of nurses was (2) nurses, and the number of technicians was (2) medical technician, while the number of health professionals reached (33) employees. The number of employees in the center, including administrators, technicians and service personnel, reached (11) employees.

### **6- Al-Adl Health Center**

The center is located in Al-Adl District, in the locality (645), was established in 1984. The area of the center is (4600 m<sup>2</sup>). It is one of the main health centers. The number of patients in Al-Adl Health Center reached (33717), and the number of specialized doctors was (2), while the number of general physicians It reached (5) doctors, and the number of dentists in the center was (8), while the number of pharmacists was (4), the number of nursing cadres was (2) nurses, and the number of health professionals reached (32) employees, while the number of technicians was (1) technician The number of administrators, technicians and servicemen working in the center was (9) employees.

### **7- Green Health Center**

The center is located in Al-Khadra neighborhood, locality (641), was established in 2013, the area of the center is (2100 m<sup>2</sup>), which is considered one of the health centers of Seha. The health visitor is successful, that the center differs from the rest of the centers as it is characterized by additional work that is not found in the rest of the centers such as (examination of those who are about to marry - sonar and radiology unit - health control checks) in addition to field vaccination campaigns and all the class programs in the rest of the health centers and will be carried out Implementing e-governance once and for all and it is under implementation and completion. The number of visitors to the center reached (28,465), the number of specialized doctors was (3), the number of general doctors was (6), while the number of dentists was (10), the number of pharmacists was (2), while the number of health professionals was (30) employees, and it occupies the first place in the number of technicians, as their number reached (8) medical technicians, while the number of administrators, technicians and servicemen reached (12) employees.



### **8- Al Mansour Model Health Center**

The center is located in the Andalus neighborhood, locality (617), was established in 2009, occupies an area of (1600 m<sup>2</sup>), and it is one of the main health centers in which the family medicine system is applied in the study area, and it is the second health center in which this system is applied after Al Salam Health Center in Al Tobji This system includes examining the patient in the health center after filling out a health form, which includes all the health information of the patient and all family members, where each doctor has a fixed number of families and this depends on the number of doctors in the center and the number of people in the geographical area in which the health center is located. The number of visitors to the health center reached (26,825). Al-Mansour Model Health Center occupies the first place in the number of specialized and general doctors, as the number of specialized doctors reached (7), and the number of general doctors reached (11) while the number of dentists in the center reached (10) The number of pharmacists was (4), while the number of nurses working in the center was (2) nurses, while the number of health professionals was (33) employees, and the number of technicians was (4) medical technician, and the number of technicians, technicians and servicemen was (14) employees.

### **9- Washash Health Center**

The center is located in the Ramadan district (619), was founded in 1953, and has an area of (2000 m<sup>2</sup>). The center includes a number of units that provide medical, therapeutic and diagnostic services in the study area, including (laboratory unit - pharmacy unit - dressing unit - and dental unit). The number of visitors to the center was (15,365), and the number of specialized doctors in the center was (3), the number of general doctors was (7), the number of dentists was (13), while the number of pharmacists was (3), and the number of nurses (4) nurses. As for the number of those with health professions, it reached (17) employees. The number of technicians was (2), while the number of administrators, technicians and service personnel was (6).

### **10- Yarmouk health center**

The center is located in the Yarmouk neighborhood, locality (612), was established in 2011, the area of the center is (3500 m<sup>2</sup>), and it is one of the main health centers for family medicine. The center contains a number of units that provide health services in the study area, such as (laboratory unit - dental unit - and the center The second immunodeficiency (AIDS), and the center provides citizens with an international health certificate when they travel outside the country. The number of visitors to the center is 27,936, and the number of specialized doctors is (3), while the number of general doctors is (6), while the number of dentists The center's employees are (12) doctors, the number of pharmacists working in the center is (6), and the number of nurses is (2) nurses. The number of health professionals is (27), while the number of

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technicians working in the center is (3), and the number of administrators and technicians and servants (13).

### **11- Hittin Health Center**

The center is located in the neighborhood of Hittin Mahalla (622), was established in 2013, the area of the center is (2700 m<sup>2</sup>), and it is one of the main health centers. The center contains all medical and treatment services and a number of units, including (laboratory unit - integrated care unit for children under age (fifth). – Nutritional unit – Mother's care unit – Radiology unit – School health unit – Optometry unit – Dental unit – Vaccination unit). The number of visitors to the Hittin health center reached (22165), the number of specialized doctors was (1), the number of general doctors was (3), while the number of dentists was (12), the number of pharmacists was (3), and the number of health professionals was (25 employees, and the number of administrators, technicians and servants working in the center was (9).

### **12- Al-Jamea health center**

The center is located in Al-Khadra neighborhood, locality (637), was established in 2004, the area of the center is (1400 m<sup>2</sup>), the center includes a number of units, including (continuing education unit - vaccination unit - school health unit - mental health unit - health promotion unit - organization unit Family - Civil Defense Unit). The number of visitors to the center during the year 2020 was (19743), and the number of specialized doctors was (1), and the number of general doctors was (2), and the number of dentists was (2) When the number of pharmacists reached (2), the number of health professionals was (3) employees, while the number of administrators, technicians and service personnel working in the center reached (5) employees.

### **13- Al-Eskan Health Center**

The center is located in the Ramadan neighborhood, locality (625), was established in 1976. It has an area of (700 m<sup>2</sup>). It contains one building. It is one of the main health centers that provides its services to the residents of the study area. The center contains a number of units such as (laboratory unit, dental unit and vaccines unit and child care unit). The number of visitors to the center reached (23827), the number of specialized doctors in the center was (2), the number of general doctors was (5), and the number of dentists working in the center was (8), while the number of pharmacists working in the center (1) Pharmacist, and the number of nurses was (2) nurses, while the number of health professionals was (26) employees, and the number of technicians was (3) medical technician, while the number of administrators, technicians and servicemen working in the center reached (6) employees.

### **14- Al Dakhiliyah Health Center**

The center is located in the Yarmouk district, locality (614), was founded in 1978, the area of the center is (2100 m<sup>2</sup>), and it is one of the main centers for primary health care, the number of patients to the center reached (16,284). As for the total number of medical and health cadres and

administrative cadres The number of administrative, technical and service employees reached (8) employees, (1) specialized doctors and (6) general doctors. The number of dentists was (8) doctors, the number of pharmacists was (3) pharmacists, and the number of nurses working in the center was (2) The number of technicians reached (3) medical technicians, while the number of health professionals was (26) employees.

### **15- Baghdad Airport Health Center**

The center is located within the open lands covered by Al-Mansour district. It was established in 2014. The area of the center is (2500 m<sup>2</sup>). It is considered a main center that provides its services to expatriates from all countries. The number of auditors in the center reached (33925). The number of specialized doctors in the Baghdad Airport Health Center ( 2) a physician, and the number of general practitioners reached (7), while the number of dentists was (2), the number of pharmacists was (3), and the number of nurses working in it was (13) while the number of health professionals reached (10) and the number of Working cadres of administrators, technicians and service (14).

### **B- Specialized centers**

These centers are distinguished from other health centers by specializing in certain diseases and characterized by the complexity and length of treatment, and that each center specializes in certain diseased cases and its medical and health staff consists of specialists and is similar to specialized hospitals in their work with the difference in size and content, and they depend on the referral system of care centers Both main and subsidiary health centers, and there are (3) specialized health centers in Al-Mansour district, including (Al-Mamoon Dental Center, Al-Amriya Dental Specialist Center, Al-Daoudi Dental Specialist Center), and it appears from Table (3) and (4) and Map (3) the following:

#### **1- Al-Mamoon dental center**

The center is located in the Yarmouk district, Mahalla (612), within the Yarmouk Health Center for Family Medicine. The center works by referral system from hospitals and major health centers. The center includes medical units specialized in dentistry, including (examination unit - surgery unit - root canal unit - diseases unit Periodontics - Restoration unit - Dental fillings - Child protection unit - Dental implant unit - Laser unit - Pharmacy unit - Radiology unit - Accounts and tickets unit. The center also provides training services for newly graduated dentists (newly graduated) for a calendar year, during which they train on branches Dentists, as the number of auditors reached (25,432), and it ranked first in the number of dentists, as the number of dentists working in the center reached (84), and the number of pharmacists was (4), while the number of health professionals reached (21) employees, and the number of technicians In the center (1) is a medical technician, and the number of administrators, technicians and servicemen is 19.

## 2- Amriya dental center

The center is located in Al-Amiriya district (630), within the Al-Amriya Health Center for Family Medicine. The center was established in 2005 and is considered one of the first specialized centers in Iraq in the field of dental treatment. The center has a number of units, including (pollution control unit - children's unit - unit Periodontal Diseases - Oral and Dental Surgery Unit - Dental Industry Unit - Root Filling Unit - Examination Unit - Surgery Unit - Radiology Unit - Dental Treatment Unit - Dental Implant Unit - Continuing Medical Education Unit()) The number of visitors to the center was 27,687. The number of dentists working in the center reached (75), while the number of pharmacists in the center reached (5). It also came in the first place in terms of the number of health professionals, as their number reached (52) employees, and the number of technicians was (4) medical technician. The number of nurses in The center reached (1) nurses, and the number of administrators, technicians and servicemen reached (20).

## 3- Daoudi Dental Specialist Center

The center is located in Al-Khadra neighborhood, Mahalla (637), with an area of (5635 m<sup>2</sup>). The center was established in 2009. It contains a number of units, including (orthodontic unit - maintenance unit - continuing education unit - laboratory unit - media unit - dental industry unit Examination Unit - Radiology Unit - Pharmacy Unit - Self-Accounts Unit) The center works by referral system from hospitals and major health centers, where the number of visitors to the center reached (19,534), and the number of dentists working in the center reached 39, and the number of pharmacists working in the center (3) Pharmacist, the number of nurses was (1), while the number of health professionals was (26) employees, and it came in first place in terms of the number of technicians working in the center, its number reached (26) medical technicians, and the number of administrators, technicians and servicemen was (14).

**Table (3) The spatial distribution of specialized centers in Al-Mansour district for the year 2020.**

No.	Health centers	Neighborhood	canton	Area (m <sup>2</sup> )	Building year	Rev. No.
1	Al-Mamoon	Yarmouk	612	Yarmouk H.C.	2015	52432
2	Daoudi	Al-Khadraa	637	5635	2009	19534
3	Amriya	Amriya	630	Amriya H.C.	2005	27687
<b>Total</b>						<b>72623</b>

Source/ based on

- field study

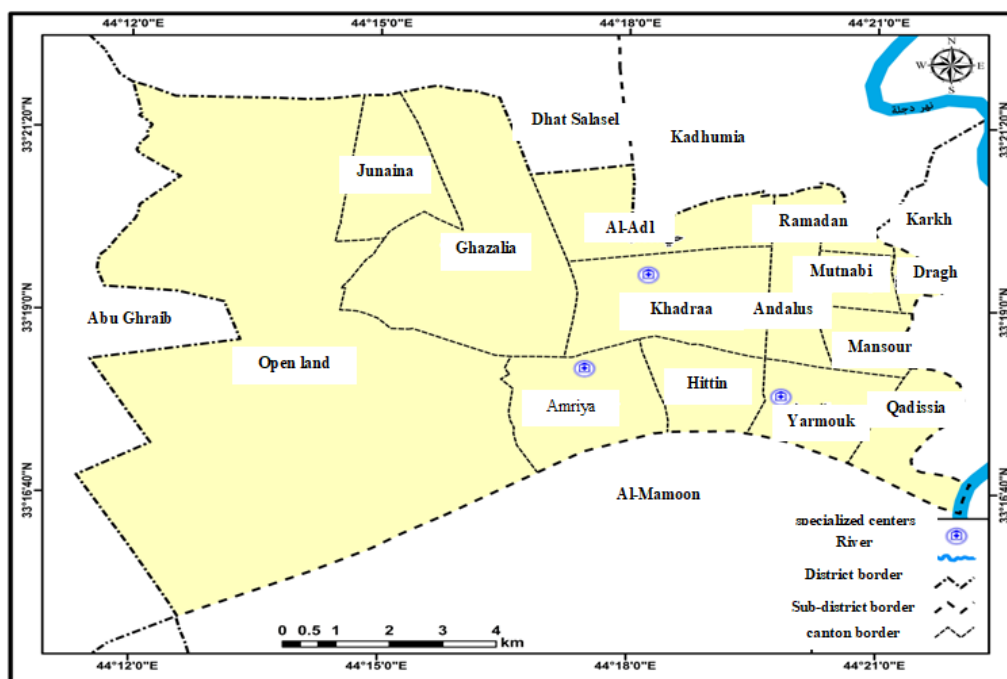
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- Republic of Iraq, Ministry of Health, Baghdad/Karkh Health Department, Technical Affairs Department, Survey Division, unpublished data, 2020.

**Table (4) Distribution of cadres working in specialized centers in Al-Mansour district for the year 2020.**

No.	Health centers	Den.	Pharm.	Nurse	Health prof.	Medical tech.	Serv. Tech.
1	Al-Mamoon	384	4	0	21	1	19
2	Daoudi	39	3	1	26	20	14
3	Amriya	75	5	1	52	4	20
<b>Total</b>		<b>198</b>	<b>12</b>	<b>2</b>	<b>99</b>	<b>25</b>	<b>54</b>

Source/ Republic of Iraq, Ministry of Health, Baghdad/Karkh Health Department, Planning Department, Manpower Division, unpublished data, 2020.



Map (3) of the spatial distribution of specialized health centers in Al-Mansour district for the year 2020.

Source/ based on data in Table (3)

### The second topic: assessing the efficiency of health centers in Al-Mansour district:

Achieving health efficiency is through providing the most appropriate health services to the patient and society and providing the maximum benefit within the limits of the available resources, especially when those resources are limited. The quality of health services depends on the effectiveness, impact and expected results of providing the service in the curative aspect as well as in the preventive aspect and health promotion. The research was based on many functional and cadastral indicators and compared them with local standards by the Iraqi Ministry of Health, as well as the field study and questionnaire in order to know the efficiency of health centers in the Al-Mansur district.

### **First: Functional indicators for health institutions**

It is one of the general indicators that assess the level of efficiency for the use of human resources in the health sector, especially with regard to these two categories, which are among the most important categories for health activities, as they contribute to the completion of all major health activities, which requires a balanced structure pattern for the relationship between the two categories, and any defect will affect negatively on this structure and on the efficiency of its work, and consequently the low level of the hospital's performance in general." The World Health Organization has set the global standard for this indicator, which is (1/1) a person with health professionals for each patient, while the local standard reached (1/3) ) One of the health professionals for each doctor. When this criterion is applied to the main health centers, it has been classified into three levels:

**The first level:** includes the rate of health professionals for each doctor that is higher than the international standard, which includes the health centers, Al-Ghazaliya Health Center (2.15), Al-Bakriya Health Center (2.00), and Al-Adl Health Center (2.13). This increase leads to the efficiency of the services provided and the efficiency of work in these areas. Health centers as required.

**The second level:** includes the rate of health professionals for each doctor that is close to the local standard, which includes each of the health centers, Al-Shaheed SaifZaki Health Center (1.78), Al Dakhiliya Health Center (1.73), Al Khadra Health Center (1.57), and Hittin Health Center (1.56), in turn It improves the efficiency of the health services provided

The third level: includes the rate of health professionals for each doctor that is lower than the local standard, and it includes the Al-Amriya Health Center (1.32), Al-Iskan Health Center (1.33), Yarmouk Health Center (1.28), Al-Mansour Model Health Center (1.17), Iraq Health Center Al-Jadeed (0.90), Al-Wash Health Center (0.73), University Health Center (0.60). The significant shortage in the indicator for these centers indicates the inefficiency of these centers in light of the standard

As for the specialized centers, according to the same table, they came with similar rates and a low index of the international standard, which are Al-Amriya Dental Center with a rate of (0.69), Al-Daoudi Dental Center with a rate of (0.66) and Al-Mamoon Dental Center with a rate of

(0.25), and This decline affects the efficiency of doctors and health services provided in these centers.

## **2- The rate of nurses per doctor**

The World Health Organization determined the global average of the standard (3/1) nurses per doctor, while the local standard specified a rate of (4/1) nurses per doctor, and when this standard was applied to the main health centers, the rates varied between (0.17 - 0.13 - 0.8 - 0.9) - 0.9) nurses for each doctor, while in specialized centers and popular medical clinics, they suffered from a decrease in this indicator. The ratios varied between (0.66-0.1) nurses per doctor, and that some of the main health centers and specialized centers were zero because the institution was devoid of nurses, and that this The low rates of the index reflect negatively on the efficiency of this segment in providing health services.

### **Second: Cadastral indicators of health centers:**

The land spaces are of great importance, as they are one of the measures of spatial efficiency, especially health institutions, and that the provision of spaces contributes to the development, support and establishment of various health institutions and also contributes to meeting the needs of the population, and that the study of spatial efficiency is of great importance for health institutions, as it is not limited to infrastructure For these institutions only, but also includes the green spaces that surround the health institution, which works to soften the atmosphere and add the aesthetic view of the health institutions, in addition to the patients' feeling of satisfaction. The local standard for health institutions has been set in order to achieve functional and service efficiency for the population.

#### **1- The area of the main health centers**

The global and local standard was set for the main areas (5000 m), and the number of the main health centers in Al-Mansour district reached (14) health centers with an area of (41600 m) at a rate of (2971.4), which is a low rate compared to the global and local standard

The highest rate of the standard was in Al-Amriya health center with an area of (12800 m), which is a rate that exceeds the international and local standard, while the lowest rate of the standard was in the Al-Iskan health center (700 m). And the locality specified above, which has a clear impact on the spatial efficiency and what it affects the efficiency of providing health services in all health centers in the Mansour district.

### **Third: Analysis of the spatial efficiency of health centers:**

#### **1 Ease of access**

The criterion (ease of access) is one of the most important criteria used in measuring the reality of the efficiency of health services, as access to health services requires the existence of prior planning studies through which the appropriate spatial locations for health institutions are

selected to facilitate the process of access to them and their fair distribution among different regions and cities for greater service as much population as possible. We find that the factor of distance and time to reach the health institution constitutes a major challenge, especially in critical cases that require urgent medical intervention. Hence, the importance and impact of this criterion appears, as well as the type of transportation used to reach health institutions. The distance an individual travels to reach the nearest health institution has been set at (700) meters inside the city, at a rate of (10-15) minutes as the time taken to reach health services.

**Table (4) Average distance traveled to reach the location of health institutions in Al-Mansour district for the year 2020.**

Health institution	less than standard		equal to standard		higher than standard	
	No.	%	No.	%	No.	%
<b>Health Center</b>	107	27.86	191	49.73	86	22.39
<b>Specialized Centers</b>	18	4.68	70	18.22	296	77.10

Source/ Questionnaire Form/ Question Results (4).

**Table (5) The average time it takes to reach the locations of health institutions in Al-Mansour district.**

Health institution	less than 5 minutes		5 - 10 minutes		10 – 15 minutes		more than 15 minutes	
	No.	%	No.	%	No.	%	No.	%
<b>Health Center</b>	49	12.76	107	27.86	154	40.10	74	19.28
<b>Specialized Centers</b>	27	7.03	75	19.53	76	19.79	206	53.65

Source/ Questionnaire Form/ Question Results (7).

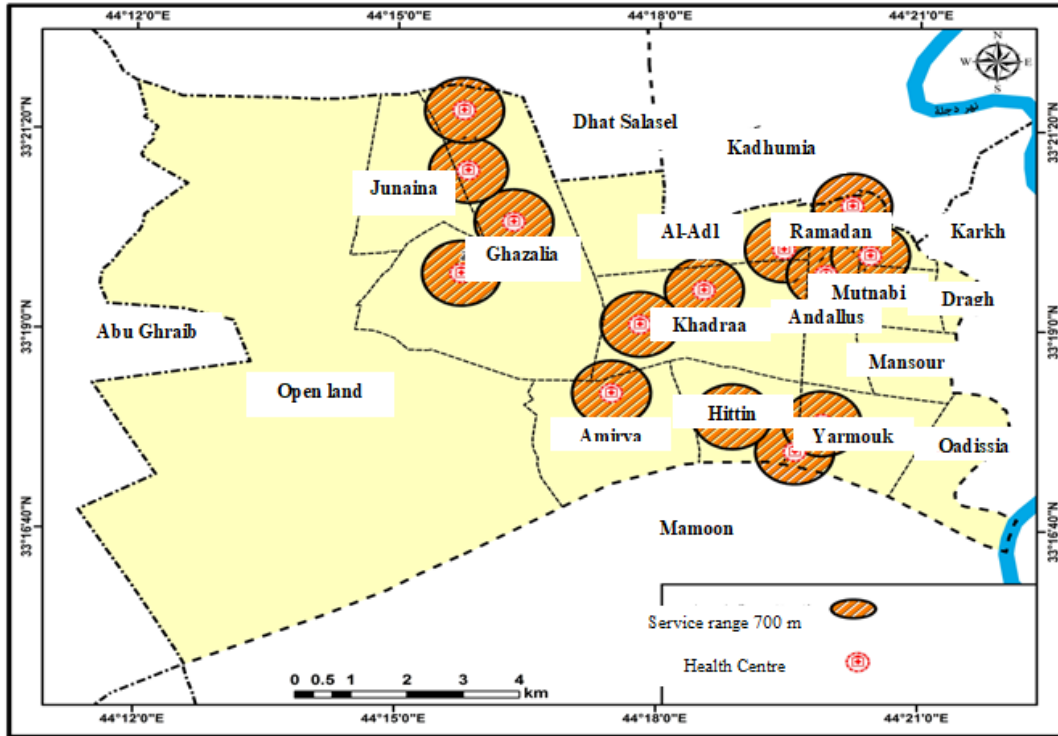
From the analysis of the questionnaire based on the answers of the respondents in the neighborhoods of Al-Mansour district, the following becomes clear:

#### **A- Primary health care centers**

Table (4) shows that (27.86%) of the respondents travel a distance less than the specified standard to reach health centers, while the largest percentage of respondents (49.73%) travel a distance equal to the standard, and this is due to the large number of health centers and their spread in most residential neighborhoods, which Easily accessible to residents. While the percentage of the population that travels a distance greater than the specified standard recorded a response (22.39%) of the respondents due to the lack of health centers in some residential neighborhoods, as is the case in the neighborhoods of El Geneina, Mansour and some other neighborhoods that are devoid of any health center, see map (22). As for the average time taken to reach the health centers, it appears from Table (5) that the largest percentage of respondents (40.10%) answered that the time taken to reach the health centers ranged between (10-15)



minutes, while (19.28%) of the respondents recorded that it takes them to reach the health centers. Health centers are more than (15) minutes, as there are neighborhoods that do not include health centers, which forces residents to travel long distances that take a longer time to reach health services, table (5).

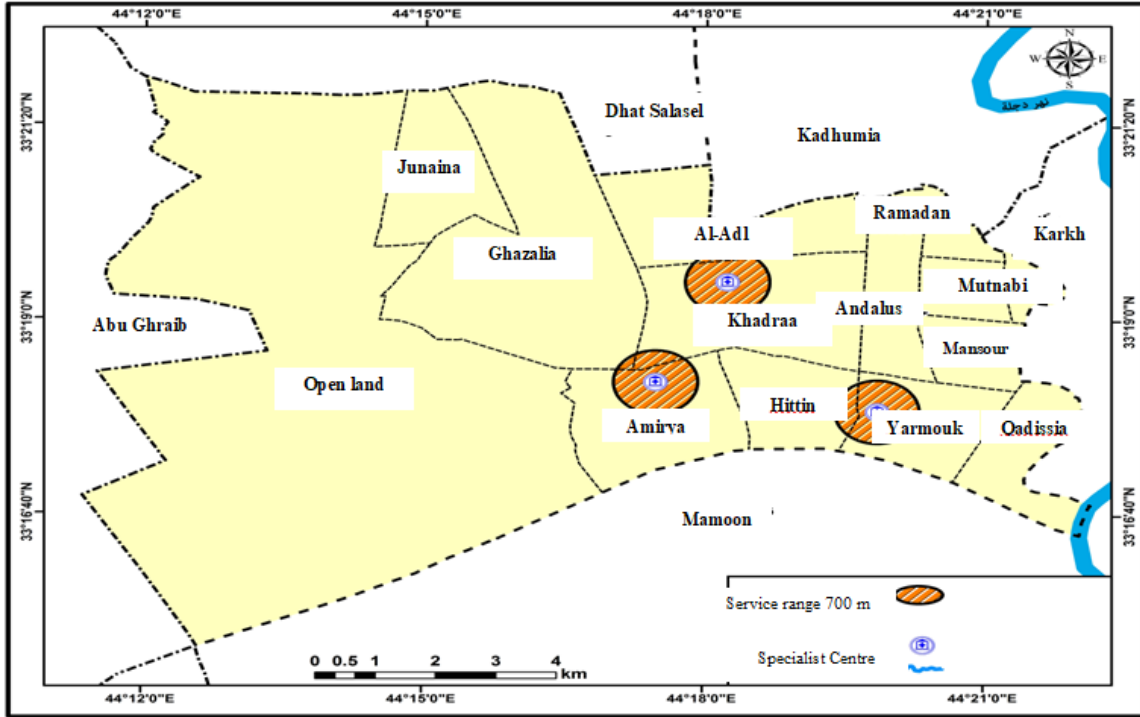


Map (4) The distance and time of arrival to health care centers in Al-Mansour district for the year 2020.

Source/ based on data from Table (4) and (5)

**B - Specialized centers**

With regard to the specialized centers, and after looking at Table (4), the percentage of (77.1%) of the respondents walk a distance higher than the standard, as a result of the small number of specialized centers in the study area, as it included (3) specialized centers distributed over (3) neighborhoods, see the map ( 5). And the small number of them was directly reflected on the average time taken to reach them, as it appears from Table (5) that (53.65%) of the respondents take more than 15 minutes to reach the specialized centers in the study area.



**Map (6) The distance and time of arrival to the specialized centers in Al-Mansur district for the year 2020.**

Source/ based on data from Table (4) and (5)

## 2- Nearest neighbor coefficient analysis

The nearest neighbor coefficient is one of the most important tools used in spatial analysis by researchers, as it aims to reach a quantitative criterion that can be inferred on the spatial distribution pattern of the centers represented by those points. The general pattern of its spatial distribution in the study area.

Table (6) shows the spatial patterns of the distribution of the geographical phenomenon, which are of three types:

- 1- Uniform distribution pattern
- 2- Random Distribution Pattern
- 3- Clustered distribution pattern

**Table (6) nearest neighbor coefficient.**

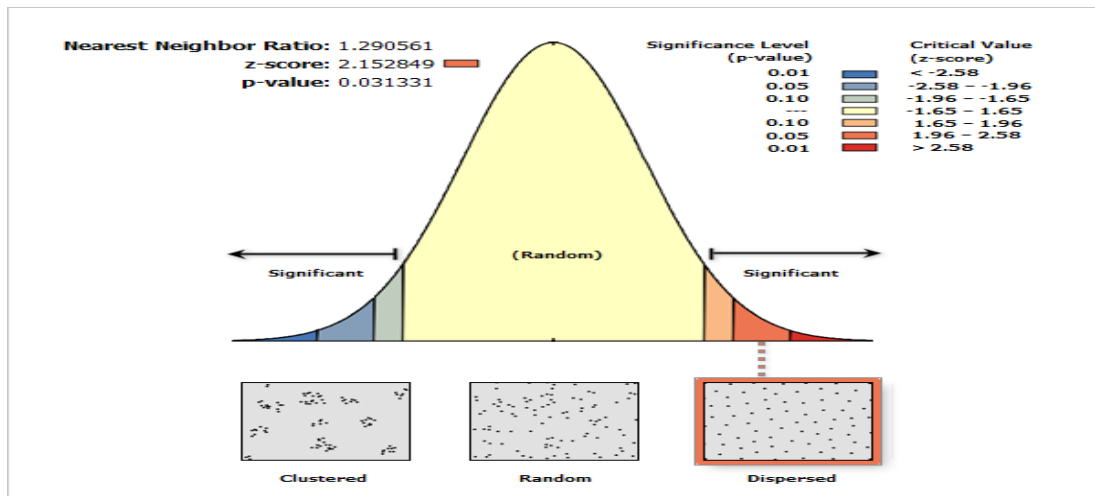
Statistical parameter value	phenomenon distribution pattern
0.00-0.09	Gathered
0.01-0.49	Cluster gathered
0.50-0.99	Aggregate heading towards the random
1.00-1.19	Random
1.20-2.15	Regular spaced

Source / Ali Abbas Al-Azzawi, Statistical Quantitative Methods in Geography, Al-Yazuri House for Publishing and Distribution, Amman, 2018, 152.

To analyze the locations of the health centers in the nearest neighbor, as follows:

The value of the nearest neighbor to the main health centers in Al-Mansur district is (1.29), which indicates that it falls within the irregular divergent pattern, as indicated in the red box in Figure (16)

**The nearest neighbor laboratories to health care centers in Al-Mansour district in 2020.**



Source/ based on ArcGIS 10.5.

As for the nearest neighbor to the specialized centers, it does not respond to the program because its number is few.

**Conclusions**

1- The number of the main health centers reached (15) health centers, (4) health centers are concentrated in Al-Ghazaliya neighborhood, (2) in Ramadan neighborhood, (2) in Al-Khadra neighborhood, and one health center in each of Yarmouk, Al-Adl, Andalus, Al-Amiriya and Hittin neighborhoods And one health center in the open lands.

- 2- The number of specialized centers reached (3), concentrated in Al-Amriya, Al-Khadra, and Yarmouk districts, all of which are specialized dental centers.
- 3- There is an imbalance in the distribution of health centers with the size of the population, both spatially and functionally, and this indicates the low level of health services and their inefficiency provided to the population.
- 4- A large proportion of the residents of Al-Mansour district travel a long distance to reach health institutions.
- 5- The standard level for the areas of the main health centers for all centers was lower than the global and local standard, which leaves a clear impact on the spatial efficiency and what affects the efficiency of health service delivery.
- 6- The results of the statistical analysis of the efficiency of the spatial location of the health centers in Al-Mansour district showed the pattern of irregular spaced distribution. Also, the nearest neighbor of the specialized centers did not respond with the program because their number was few.

### **Recommendations**

- 1- Establishment of health centers in a manner commensurate with the size of the population with each of the neighborhoods of the Mansour district.
- 2- Providing the main and specialized health centers with modern medical devices.
- 3- Establishing other specialized centers for allergies, ophthalmology, heart diseases and others.
- 4- Distribute medical specialties of all kinds fairly in order to create a state of balance between health institutions.
- 5- The trend towards appointing many medical and health staff according to the future need in order to achieve functional efficiency in the number of medical and health staff for the population.

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